ORIGINAL ARTICLE

FREQUENCY OF MICROBIAL SPECTRUM OF SPONTANEOUS BACTERIAL PERITONITIS IN ESTABLISHED CIRRHOSIS LIVER

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Background: Spontaneous bacterial peritonitis is one of the most frequent and serious complication in patients with liver cirrhosis and ascites associated with high mortality. Empiric antibiotic therapy should be initiated before the results of ascitic fluid cultures are available, guided by knowledge of the microbial spectrum of spontaneous bacterial peritonitis in a particular population. **Methods:** This is a descriptive study which was carried out in the Department of Gastroenterology and Hepatology, Postgraduate Medical Institute Hayatabad Medical Complex, Peshawar from January 2007 to December 2007. Fifty consecutive patients of established cirrhosis liver with ascites presenting with suspicion and or risk factors for spontaneous bacterial peritonitis were included in the study after informed consent. All selected patients were subjected to ascitic fluid tap. Twenty ml of ascitic fluid was aspirated in a heparinised disposable syringe; out of it 10 ml was immediately inoculated into blood culture bottle at bedside and sent for bacterial culture along with the remaining 10 ml for routine biochemical and cytological examination. **Results:** Out of 50 patients, 28 (56%) were diagnosed to have spontaneous bacterial peritonitis or its variants. Classic spontaneous bacterial peritonitis was present in 11 patients (39.28%), 16 (57.14%) patients were found to have culture negative neutrocytic ascites and one patient (3.57%) had bacterascites. Out of 28 cases of spontaneous bacterial peritonitis 12 samples of ascitic fluid showed positive culture reports. *E. coli* was the most frequently cultured organism isolated in 8 (66.66%) cases, *Streptococcus pneumonae* in 2 patients (16.66%), *Staphylococcus aurus* and *Klebsiella* each in 1 case (8.33%). **Conclusion:** Spontaneous bacterial peritonitis and its variants is a common complication of liver cirrhosis with ascites. *E. coli* is the most frequent offending organism in these cases. Knowledge of the microbial spectrum of spontaneous bacterial peritonitis in a particular population is important for the selection of the most appropriate empiric antibiotic regimen.

Keywords: Cirrhosis liver, Spontaneous bacterial peritonitis, Ascitic fluid culture

INTRODUCTION

Spontaneous bacterial peritonitis is one of the most frequent and serious complication in patients with liver cirrhosis and ascites associated with high mortality.[1] It is defined as bacterial infection of the ascitic fluid in the absence of an apparent intra-abdominal source of infection. The incidence of spontaneous bacterial peritonitis in hospitalised patients with cirrhosis varies from 7–23% in the West.[2] It is around 33% in Pakistan.[3,4]

The diagnostic criteria for spontaneous bacterial peritonitis is the presence of >500/mm^3 leucocytes or the presence of >250/mm^3 Neutrophils in the ascitic fluid and or positive ascitic fluid culture.[5–7] Depending on the cell count and culture of ascitic fluid, it has been classified into its variants.[8,9]

1. Classic spontaneous bacterial peritonitis is defined as ascetic fluid polymorph count ≥250/mm^3 and positive ascitic fluid culture.
2. Culture negative neutrocytic ascites (CNNA) is defined as ascitic fluid leukocyte count ≥500/mm^3 or neutrophil count ≥250/mm^3 with negative ascitic fluid culture.
3. Bacterascites (BA) is defined as ascitic fluid neutrophil count ≤250/mm^3 with positive ascitic fluid culture.

Translocation of bacteria from the intestinal lumen due to decreased phagocytic activity of macrophages and increased intestinal permeability in cirrhotic patients is an important step in the development of spontaneous bacterial peritonitis.[10,11] These bacteria are mostly gram negative, when outgrow the capacity of mesenteric lymph nodes spill over into the blood stream. Subsequently these circulating bacteria colonise the ascetic fluid and cause spontaneous bacterial peritonitis. Thus most organisms causing spontaneous bacterial peritonitis are derived from the intestinal flora. Usually a single micro-organism is cultured and it is frequently a gram negative bacterium such as *E. Coli* or a *Klebsiella* species.[12,13]

Recognising the common pathogens associated with spontaneous bacterial peritonitis will help in the selection of antibiotic. Since spontaneous bacterial peritonitis is a serious complication with a high mortality in patients with liver cirrhosis, empiric antibiotic therapy should be initiated before the results of ascitic fluid culture is available which is guided by

knowledge of the microbial spectrum of spontaneous bacterial peritonitis in a particular population.

This study was conducted to see various organisms causing spontaneous bacterial peritonitis in Peshawar and surrounding areas in Pakistan.

MATERIAL AND METHODS

This descriptive study was carried out in the Department of Gastroenterology and Hepatology PGMI/Hayatabad Medical Complex, Peshawar from Jan 2007 to Dec 2007. Fifty consecutive patients of established cirrhosis liver and ascites presenting with suspicion and/or risk factors for spontaneous bacterial peritonitis were included in the study after informed consent. This included patients presenting with fever, increasing abdominal distension, abdominal pain or discomfort, Hepatic encephalopathy and upper gastrointestinal bleed. It was also ensured that none of the patients had taken antibiotic therapy in the last 72 hours. Patients with suspicion of secondary peritonitis, like those with recent abdominal surgery or trauma were excluded.

After detailed history and physical examination, investigations like blood count, liver function tests, blood glucose, urine examination, X-rays erect abdomen and abdominal ultrasound were done.

All selected patients were subjected to ascetic fluid tap, under aseptic measures by inserting a needle of 22 or 18 gauge in the left flank of abdomen. Twenty ml of ascetic fluid was aspirated in a heparinised disposable syringe; out of it 10 ml was immediately inoculated into blood culture bottle at bedside and send for bacterial culture along with the remaining 10 ml for routine biochemical and cytological examination. All the findings were recorded in a special Performa.

Values of continuous variables were expressed as Mean±SD. Male to female ratio was determined. Categorical variables were expressed as percentages. Data was analysed using SPSS-10.

RESULTS

Fifty cirrhotic patients with ascites presenting with clinical suspicion of spontaneous bacterial peritonitis were included. There were 29 male (58%) and 21 female (42%) patients with a male to female ratio of 1.4:1. The age of patients ranged from 20–80 years. The mean age was 50.20±14.39 years. Majority of the patients were in the age group of 30–70 years. Twenty seven patients were positive for Anti-HCV, 10 patients for HBsAg and 5 patients were positive for both (Table-1). In 7 patients both HBsAg and Anti-HCV were negative.

Out of 50 patients, 28 were diagnosed to have spontaneous bacterial peritonitis or its variants (56%). Classic spontaneous bacterial peritonitis was present in 11 patients (39.28%), 16 (57.14%) patients were found to have culture negative neutrocytic ascites and 1 patient (3.57%) was having bacterascites (Table-2). Out of 28 cases of spontaneous bacterial peritonitis 12 samples of ascetic fluid showed positive culture reports. *E. coli* was the most frequently cultured organism isolated in 8 cases (66.66%), *Streptococcus pneumoniae* in 2 patients (16.66%), *Staphylococcus aureus* and *Klebsiella* each in 1 case (8.33%) (Table-3).

Table-1: HCV and HBsAg distribution

	Number	%
Anti HCV	27	54.00
HBsAg	10	20.00
Anti HCV and HBsAg	5	10.0
Nagative	8	16.0

Table-2: Pattern of spontaneous bacterial peritonitis

	Frequency	%
Classic spontaneous bacterial peritonitis	11	39.3
Culture Negative neutrocytic ascitis	16	57.1
Bacterascites	1	3.6
Total	28	100.0

Table-3: Culture pattern of spontaneous bacterial peritonitis in cirrhosis liver

Organism	Frequency	%
E. Coli	8	66.66
Streptococcus	2	16.66
Staphylococcus Aureus	1	8.33
Klebsiella	1	8.33

DISCUSSION

The frequency of spontaneous bacterial peritonitis in hospitalised patients with cirrhosis varies from 7 to 23% in the West.[2] It is around 33% in Pakistan.[3,4] In our study the frequency was 56% which is comparable to a study by Iqbal S *et al*[14], but much higher than that reported in the world literature,[15] and some of the local data[16]. The most probable reason for high frequency in our study is the inclusion of only those patients where there was high clinical suspicion of spontaneous bacterial peritonitis. Other factors which may be responsible include under-nourishment, poverty, and advanced liver disease.

We used blood culture bottles for the culture of ascetic fluid as the positive yield is higher than that on agar plates.[17] Out of 28 cases of spontaneous bacterial peritonitis 12 samples of ascitic fluid showed positive culture reports (42.85%) which is comparable to that reported by Iqbal S *et al*[14] but lower than that reported by Rajput *et al*[17]. This may be because of the fact that majority of our patients were malnourished with a poor immune system and can become ill with a low pathogenic dose of bacteria. In our study classic spontaneous bacterial peritonitis was diagnosed in 39.28% of patients where as its variants, culture negative neutrocytic ascites and bacterascites was diagnosed in 57.14% and 3.57% of the cases respectively. Rajput *et al*[17] in the study conducted at Chandka Medical College Hospital Larkana found

classic spontaneous bacterial peritonitis in 34.5% of their patients whereas culture negative neutrocytic ascites and bacterascites in 62.1% and 3.4% of their cases respectively. Another study by Taj *et al*[18] conducted at Khyber Teaching Hospital supports our findings, the values are classical SBP 37.93%, CNNA 55.17% and BA 6.89%. These figures support our findings. In another study carried out by Iqbal *et al*[3] at Rawalpindi Medical College reported classic spontaneous bacterial peritonitis in 33.3% of the cases whereas culture negative neutrocytic ascites was found in 66.7% of the cases. None of the patients in his study was diagnosed having bacterascites. This difference in the frequency of bacterascites could be due to small number of patients in our study.

E. coli was the most frequently cultured organism isolated in 66.66% of cases, *Streptococcus pneumoniae* in 16.66% cases where as *Staphylococcus* and *Klebsiella* in 8.33% each. These results are inline with the findings of other studies on microbial spectrum of spontaneous bacterial peritonitis.[17,18]

Taj *et al*[18] reported *E. Coli* in (61.55%) and *Streptococci* in (15.38%) in their study. Haider *et al*[19], reported *E. Coli* 30% which is low compared to our study. The reason for this could not be explained.

CONCLUSION

Spontaneous bacterial peritonitis and its variants is a common complication of liver cirrhosis with ascites. *E. coli* is the most frequent offending organism in these cases. Knowledge of the microbial spectrum of spontaneous bacterial peritonitis in a particular population is important for the selection of the most appropriate empiric antibiotic regimen.

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